mixture and the mixture is conveyed through the passageway, is purified, and leaves the purifier through the dispensing outlet, the purifier comprising:

a. the liquid passageway downstream of a region where the ozone-containing gas joins the liquid being formed into an upflow chamber configured so that a leading flow of the liquid rises at a rate exceeded by a rate of rise of bubbles of the ozone-containing gas entering the upflow chamber with the liquid so that the ozone-containing gas overtakes the leading liquid flow causing a leading volume of liquid flow to be contacted with ozone early in its advance through the passageway; and

b. the liquid passageway includes ozone and liquid mixing and a liquid flow configuration that ensures purifying contact of the liquid with ozone before the liquid reaches the dispensing outlet.

REMARKS

The Rejection of Claims 1, 21, and 39 Under 35 USC § 112

The term "once" has been removed from claims 1, 21, and 39 and the claims have been amended to avoid the examiner's §112 rejection. In their amended form, claims 1, 21, and 39 are adequately supported by the original disclosure and reasonably convey to those of ordinary skill in the art that the inventor had possession of the claimed invention at the time the application was filed.

The Rejection of Claims 1, 5, 8, 9, 11-13, 17, 18, 39, 43-45, 47-50, 54, and 55 Under 35 USC § 103 on Burris '993 in View of Barnes '016

This rejection is based on mistakes of fact regarding the teachings of Burris '993 and Barnes '016. First, although Burris '993 does disclose a batch liquid purifier, it does not disclose an upflow chamber as defined in the claims. The Burris system (depicted in FIG. 4) pumps ozone-containing gas through a line 17 into a chamber 34. The chamber 34 is filled with a volume of liquid *before* the ozone-containing gas is introduced. The ozone bubbles introduced into the liquid not only contact the liquid in the chamber 34, but also act to pump the liquid through line 35 to move the gas and the liquid downstream toward the gas and liquid separator 21 (see column 5, lines 1-8).

Unlike the liquid chamber of Burris, the upflow chamber of the claims starts relatively empty and is then filled with a flow of liquid and ozone-containing gas that enters the chamber *together* as a mixture. In addition, because the claimed upflow chamber is uniquely configured, the liquid rises slower than the rising ozone bubbles entrained in the mixture. Since the chamber of Burris is filled with liquid before the ozone-containing gas is introduced, the liquid does not rise within the chamber as ozone gas is introduced; as a result, the liquid in the chamber cannot be overcome by faster rising ozone gas bubbles. Because the claimed upflow chamber causes the rising liquid to be overcome by faster rising ozone bubbles, the claimed chamber ensures that a leading volume of liquid flow is in contact with ozone early in the purification cycle. By purifying the leading volume of liquid early in the cycle, the claimed system also ensures that the leading volume purifies any residue in the passageway from previous cycles (see page 6, lines 1-8). Since the chamber of Burris does not operate in the same manner as the claimed upflow chamber, the Burris system does not experience the initial volume purification benefits of the claimed system.

Moreover, because Barnes '016 discloses a continuous, non-batch liquid purification process, it could not have been obvious to one of ordinary skill in the art at the time of filing to modify the batch process of Burris '993 in view of the continuous, non-batch process of Barnes '016. The term "batch" when used by those of ordinary skill in the art in referring to chemical processes is used to distinguish single-cycle processes (e.g., batch distillation) from multi-cycle processes (e.g., continuous distillation). Applicant's repeated use of the term "batch" throughout the specification and the claims conveys that the claimed purification process is a single-cycle process, as understood under the conventional definition of the term as used to refer to chemical processes. Moreover, any confusion regarding whether or not the claimed system operates as a single-cycle/batch process is made clear to those of ordinary skill in the art upon examination of FIG. 1. The system of FIG. 1 only includes a single fluid passageway; it does not include any means for recirculating or continuously processing the liquid introduced into the system. Because the system of FIG. 1 only has a single fluid passageway, it is inherently obvious that the liquid being processed by this system only passes through the passageway once. Because Barnes is a continuous, multi-cycle system that recirculates liquid, it could not

have been obvious to modify Burris in view of Barnes to obtain the claimed batch, single-cycle system.

In addition, Barnes also differs from the claimed system in that the liquid chamber 11 of Barnes is continuously filled to allow continuous recirculation, whereas the upflow chamber of the claimed system is only filled once during each batch purification cycle. Since the chamber of Barnes is continuously filled, it cannot operate in the same manner as the upflow chamber of the claims. When ozone-containing gas enters the chamber of Barnes, the gas simply rises within the volume of liquid already present in the chamber. In the claimed system, the upflow chamber begins relatively empty and then fills with an gas/liquid mixture. The unique configuration of the claimed upflow chamber causes ozone in the gas/liquid mixture to rise faster than the liquid and permits the ozone to come in contact with a leading volume of liquid early in the purification cycle. By purifying the initial volume of liquid early in the purification cycle, the initial volume of liquid is able to purify any residue remaining in the system passageway from previous purification cycles. Because the liquid in the Barnes chamber is not introduced together with ozone-containing gas, and because the liquid does not rise within the chamber and is not overcome by faster rising ozone gas, the initial volume of liquid in Barnes is not purified and cannot purify residue remaining in the passageway from previous purification cycles.

Furthermore, Barnes does not include any mixer in the fluid passageway. Instead, Barnes includes a T-shaped passageway upstream of the chamber 11 that includes a filter 26 and a heater 28 in the upper branch of the T and a venturi 31 and a gas source 32 in the lower branch of the T (see column 2, lines 55-68, and column 3, lines 1-30). The claimed system, unlike Barnes, includes a first mixer 30 and a second mixer 17 upstream of the upflow chamber 40 and a third mixer 18 downstream of the upflow chamber 40 (see FIG. 1). Therefore, while the claimed system includes both upstream and downstream mixers, Barnes does not include any mixers at all, either upstream or downstream of the chamber 11. Moreover, even if one were to consider the venturi and gas source of Barnes to be a mixer, the Barnes system would still be different than the claimed system because Barnes lacks a downstream mixer.

Claims 1, 21, and 39 have been amended to make the above-described differences between the systems of Burris and Barnes and the claimed system

more clear. In light of these differences and the amendments to claims 1, 21, and 39, claims 1, 5, 8, 9, 11-13, 17, 18, 39, 43-45, 47-50, 54, and 55 are not unpatentable over Burris '993 in view of Barnes '016.

The Rejection of Claims 6 and 7 Under 35 USC § 103 Over Burris '993 in View of Barnes '016 as Applied to Claim 1, and Further in View of Uban et al. '488

As explained above, the chamber of Burris '993 operates differently than the claimed upflow chamber and fails to offer important purification advantages of the claimed upflow chamber. In addition, Barnes '016 is not a single-cycle, batch process and does not operate in the same manner as the claimed system. As a result, it could not have been obvious to one of ordinary skill in the art at the time of filing to modify Burris '993 in view of Barnes '016 to obtain the purification system as claimed.

In addition, the filter indicator of Uban '488 is different than the filter indicator of the claimed system. The filter indicator of the Uban system operates as a function of rising water level. When the level of the water reaches a predetermined height, the Uban indicator senses that the filter is clogged and initiates a cleaning operation (see column 5, lines 34-53). The Uban indicator does not operate as a function of the extent of purifier operation as claimed. The filter indicator as claimed can operate as a function of the duration of operation or as a function of a predetermined number of purification cycles, but it does not operate as a function of liquid level (see page 8, lines 13-18). Therefore, it could not have been obvious to one of ordinary skill in the art to modify Burris in view of Barnes further in view of Uban to obtain the claimed system having a filter indicator that operates as a function of the extent of system operation as claimed.

The Rejection of Claims 14-16, 20, 51-53, and 57 Under 35 USC § 103 Over Burris '993 in View of Barnes '016 as Applied to Claims 1 and 39 and Further in View of Norris '261

Again, Burris '993 does not operate in the same manner as the claimed system and does not offer important purification advantages of the claimed system. In addition, Barnes '016 is not a single-cycle/batch process and does not operate in the same manner as the claimed system. As a result, it could not

C

have been obvious to one of ordinary skill in the art at the time of filing to modify Burris '993 in view of Barnes '016 to obtain the claimed system.

Furthermore, because the removable container and the dispenser of Norris '261 are different from the container and dispenser of the claimed system, it could not have been obvious at the time of filing for one of ordinary skill in the art to modify Burris in view of Barnes further in view of Norris. First, unlike the container of the claimed system, the removable container of Norris is permanently attached to a dispenser (i.e., flexible tube 22) via a nipple either by being welded directly to the container or by being permanently secured to the container with a lock nut as shown in FIG. 3 (see page 3, left column, lines 71-75, and right column, lines 1-3). Moreover, the dispenser of Norris (i.e., the flexible tube 22), unlike the claimed dispenser, does not activate a purifier when it is extended and does not deactivate a purifier when it is retracted. Instead, the dispenser of Norris is nothing more than a length of flexible tubing 22 wherein a flow of liquid is controlled with a valve 32. Furthermore, the dispenser (i.e., flexible tube 22) of Norris does not activate a switch to block dispensing of liquid unless the dispenser is extended. Instead, liquid flow through the Norris dispenser is controlled using a valve plunger 35 to pinch the walls of the dispensing tube together. Clearly, because the container and dispenser of Norris are entirely different than the container and dispenser of the claims, it could not have been obvious for one of ordinary skill in the art at the time of filing to modify Burris in view of Barnes further in view of Norris to obtain the system having the container and dispenser as claimed.

The Rejection of Claims 21, 24, 25, 27, 28, 32, and 58 Under 35 USC § 103 Over Burris '993 in View of Barnes '016

As explained above, the purifier disclosed in Burris '993 does not operate in the same manner as the claimed purifier and therefore does not offer the same purification advantages that the claimed system offers. First, Burris does not disclose an upflow chamber as defined by the instant claims. The chamber in Burris holds a volume of liquid to be processed *prior* to the introduction of ozone-containing gas (see column 5, lines 1-8). The upflow chamber of the claimed system is relatively empty when the purification process begins and is then filled when ozone-containing gas and liquid enter the chamber together as a mixture. In addition, the upflow chamber of the claimed system is configured to ensure that when the ozone/liquid mixture enters the chamber, ozone gas

bubbles rise at a rate faster than a rate of rise of an initial volume of liquid. Since the liquid in Burris is already present before ozone gas is introduced, the liquid does not rise as ozone gas is introduced. As a result, it is impossible for ozone gas bubbles introduced in the chamber of Burris to overcome an initial volume of liquid in the chamber.

Yet another distinction between Burris and the claimed system is that in Burris, the ozone bubbles are introduced not only to contact the liquid already present in the chamber, but also to pump the liquid through a line connected to the chamber as the bubbles rise (see column 5, lines 1-8). In the claimed system, the sole function of the rising ozone bubbles is to contact the initial volume of rising liquid for purification purposes; the ozone gas is not intended to pump the liquid through the system passageway.

Finally, because the Burris system operates differently than the claimed system, the Burris system lacks important purification advantages of the claimed system. More specifically, since the liquid in the Burris chamber is not overcome by faster rising ozone bubbles, the leading volume of liquid in the Burris chamber is not contacted with ozone early in its advance through the system passageway. Furthermore, since the leading volume of liquid in Burris is not purified using an upflow chamber as claimed, the leading volume cannot purify any residue that may remain in the passageway from previous purification cycles.

In addition, as explained above, the system of Barnes is not a single-cycle batch process, as claimed, and does not operate in the same manner as the claimed system. Even though Barnes discloses a system wherein liquid and ozone are mixed before being introduced into a chamber, the system of Barnes is a multi-cycle, continuous process. Moreover, because Barnes is a continuous, non-batch process, the chamber in Barnes is continuously filled with liquid. Unlike Barnes, the upflow chamber of the claims is cyclically filled and emptied during each purification cycle in a conventional batch process fashion. Because the chamber of Barnes is continuously filled, the liquid in the Barnes chamber cannot be overcome by faster rising ozone bubbles. Instead, the level of the liquid in the Barnes chamber remains constant as the ozone gas rises. As a result, a leading volume of liquid in the Barnes chamber does not come in contact with ozone early in the purification cycle and the leading

volume of liquid leaving the chamber cannot purify residue remaining in the passageway from previous purification cycles.

Clearly, it could not have been obvious to one of ordinary skill in the art at the time of filing to modify the single-cycle, batch purification process of Burris in view of the multi-cycle, continuous purification process of Barnes. Since neither Burris nor Barnes discloses an upflow chamber as claimed, and since neither of these systems experience the purification advantages of the claimed system, these references alone or in combination cannot render the claimed system unpatentable.

The Rejection of Claims 30 and 31 Under 35 USC § 103 Over Burris '993 in View of Barnes '016 as Applied to Claim 21 and Further in View Uban et al. '488

The purification process of Burris '993 differs from the claimed purification process in several respects. As explained, the system of Burris uses a liquid chamber that operates differently than the claimed upflow chamber. The purification process of Burris involves first filling the liquid chamber with a volume of unpurified liquid. Next, an ozone-containing gas is introduced into the liquid-filled chamber. The ozone-containing gas enters the chamber, contacts the liquid in the chamber, and pumps the liquid out of the chamber through a passageway (see column 5, lines 1-8).

Unlike Burris, the claimed method of purification uses a unique upflow chamber. The claimed method begins by introducing an unpurified volume of liquid into the system. The unpurified liquid is then mixed with a gas. The liquid/gas mixture travels through a passageway and enters the relatively empty upflow chamber. Because of the chamber's unique configuration, ozone gas in the mixture rises within the upflow chamber at a rate that is more rapid than the rate of the rising liquid. As a result, the faster rising ozone gas overtakes the slower rising liquid causing an initial volume of rising liquid to come in contact with ozone early in the purification cycle. Moreover, by ensuring that the initial volume of liquid rising in the chamber is purified early in the purification process, the purified initial volume of liquid can purify any residue remaining in the passageway from previous purification cycles. After traveling through the system passageway, the purification cycle ends when a purified volume of liquid exits the system through a dispenser.

The purification process of Barnes '016 is also significantly different from the claimed method of purification. The process of Barnes, unlike the claimed method of purification, is a multi-cycle, continuous purification process. A liquid is introduced into the system and is continuously purified and recirculated through the system passageways. Once the system of Barnes is filled with liquid, the liquid is pumped through a T upstream of a liquid chamber. The liquid passing through the upper branch of the T passes through a filter and a heater while the flow of liquid passing through the lower branch of the T flows through a venturi where ozone-containing gas is introduced (see column 2, lines 55-68, and column 3, lines 1-30). The flow of liquid from the upper and lower branches of the T then enter the liquid-filled chamber. Because the system is continuous, the liquid level in the chamber remains constant throughout the purification process and the ozone-containing gas introduced into the chamber simply rises within the liquid already in the chamber. Since the Barnes process continuously recirculates the liquid being treated, the process never produces a volume of purified liquid that exits the system.

Unlike Barnes, the claimed method of purification is a single-cycle, batch process. An unpurified volume of liquid enters the system. The liquid is mixed with an ozone-containing gas. The liquid/ozone mixture travels through the system passageway and enters a relatively empty upflow chamber. Because of the unique configuration of the chamber, the ozone within the mixture rises faster than the liquid and overtakes a leading volume of liquid. The purified leading volume of liquid can then purify any residue that remains in the system passageway from a previous purification cycle. The claimed method concludes when a purified volume of liquid exits the system through a dispenser leaving the system passageway empty and ready to begin the next purification cycle.

In light of the undeniable distinctions between the claimed method of purification and the disclosed purification processes of Burris and Barnes, it clearly could not have been obvious to one of ordinary skill in the art at the time of filing to modify Burris in view of Barnes to obtain the claimed method of purification.

Furthermore, the filter indicator of Uban '488 operates in a manner that is distinctly different from the indicator defined in the claimed method of purification. The indicator of Uban evaluates liquid level to determine when the system should initiate a cleaning cycle to unclog the filter. The indicator defined

in the claimed method of purification operates as a function of the extent of purifier operation, not as a function of liquid level. Clearly, these modes of operation are totally unrelated and dissimilar from each other. As a result of the prominent differences between the filter indicator of Uban and the indicator of the claimed method of purification, it certainly could not have been obvious for one of ordinary skill in the art at the time of filing to modify the batch process of Burris in view of continuous process of Barnes further in view of Uban to obtain the claimed method of purification.

The Rejection of Claims 33-35, 37, and 38 Under 35 USC § 103 Over Burris '993 in View of Barnes '016 as Applied to Claim 21 and Further in View of Norris '261

Again, the purification system of Burris operates differently than the claimed system and lacks important purification advantages of the claimed system. The most significant difference between the claimed system and the system of Burris is the use of a unique upflow chamber in the claimed system. The system of Burris discloses a chamber that is filled with liquid *prior* to the introduction of an ozone-containing gas. In Burris, the ozone gas is introduced into the liquid already present in the chamber not only to contact and purify the liquid, but also to pump the liquid through a conduit leading away from the chamber (see column 5, lines 1-8).

Unlike Burris, the claimed system includes an upflow chamber that remains relatively empty until a liquid/gas mixture is introduced. Also unlike the system of Burris, ozone gas rising in the claimed upflow chamber only acts to purify a leading volume of rising liquid; the ozone gas does not pump the liquid through the system passageway. Furthermore, the claimed upflow chamber is designed so that the ozone bubbles in the liquid/ozone mixture rise at a rate that is faster than the rate of the rising liquid. As a result, the faster rising ozone bubbles overtake the initial volume of liquid rising in the chamber allowing the initial volume of liquid to come in contact with ozone early on in the purification cycle. By purifying the initial volume of liquid in the chamber early in the purification cycle, the purified initial volume of liquid can purify any residue that remains in the system passageway from previous purification cycles. Because the chamber of Burris does not ensure purification of the initial volume of liquid early on in the purification cycle, the initial flow of liquid in Burris cannot purify

the residue remaining in the passageway from previous purification cycles as claimed.

Furthermore, Barnes '016 is also substantially different from the claimed system. Unlike the claimed single-cycle, batch process, Barnes discloses a multi-cycle, continuous process. While the claimed process begins by introducing an unpurified volume of liquid into the system and ends when a corresponding purified volume of liquid exits the system, Barnes discloses a process that runs continuously and never produces a purified volume of liquid that exits the system.

In addition to being a continuous, non-batch process, Barnes also lacks several key features of the claimed system. For instance, while the claimed system includes mixers both upstream and downstream of the liquid chamber, Barnes fails to disclose any mixers, either upstream or downstream of the liquid chamber. Moreover, because the system of Barnes is continuous, the liquid chamber of Barnes remains filled throughout the system's operation. As a result, the ozone gas entering the chamber does not rise together with a slower rising volume of liquid. Consequently, a leading volume of liquid in Barnes is not purified early in the purification cycle as claimed. Moreover, since the initial volume of liquid is not purified using an upflow chamber as claimed, the initial volume of liquid cannot purify any residue in the system passageway.

Finally, the liquid dispenser and the removable container of Norris '261 are undeniably different than the dispenser and removable container of the claimed system. First, the dispenser of Norris is nothing more than a length of flexible tubing. Unlike the dispenser of the claimed system, the flexible tube dispenser of Norris does not activate a purifier when it is extended and does not deactivate a purifier when it is retracted. Furthermore, the flexible tube dispenser of Norris does not activate a switch to block liquid flow unless the dispenser is extended as claimed. Liquid flow through the flexible dispenser of Norris is controlled using a simple valve having a plunger that pinches the walls of the tube together to restrict liquid flow. In addition, whereas the claimed removable liquid container is separable from the claimed liquid dispenser, the liquid container of Norris is permanently attached to the flexible tube dispenser.

Because of the unquestionable differences between the dispenser and container of the claims and the dispenser and container of Norris, it could not

have been obvious for one of ordinary skill in the art to modify the batch process of Burris in view of the continuous process of Barnes further in view of the dispenser and container of Norris to obtain the unique batch purification system having the dispenser and removable container as claimed.

* * * *

In view of the above, the applicant submits that claims 1, 5-9, 11-18, 20, 21, 25, 27, 28, 30-35, 37-39, 43-45, 47-55, 57, and 58 are now allowable based on the foregoing amendments and distinctions. Reconsideration and withdrawal of the rejections and objections are respectfully requested. Should the examiner have any questions, comments, or suggestions, he is invited to call applicant's representative at the number below.

Respectfully submitted,

E S Stephens

Eugene S. Stephens
Reg. No. 20,649
Eugene Stephens & Associates
56 Windsor Street
Rochester, New York 14605
VOX: 716-232-7700
FAX: 716-232-7188
E-Mail: esspat@frontiernet.net

DEC 22 1999

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:

Assistant Commissioner for Patents
Washington, D.C. 20231

on DEC 22 1999

Signature: E B Austin

Date of Signature DEC 22 1999